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EXAMINER	
SCHINDLER, DAVID M	

ART UNIT	PAPER NUMBER
2862	

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	**Application No.** 10/679,905	**Applicant(s)** JU ET AL.
	Examiner David Schindler	**Art Unit** 2862

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _06 December 2005_.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-31_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-31_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _06 October 2003_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _12/06/05_.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

1. This action is in response to the communication received on 12/06/2005.

Allowable Subject Matter

2. Upon further consideration, the allowance of claims 1-31 is withdrawn in favor of the claim rejections below.

Specification

3. The disclosure is objected to because of the following informalities:

There appears to be a period missing after the term "field" on line 3 of page 10.

Appropriate correction is required.

Claim Objections

4. Claims 1 and 12 are objected to because of the following informalities:

As to Claim 1,

The phrase "the anisotropy field distribution and volume distribution values" on line 10 lacks antecedent basis.

As to Claim 12,

The term "an" in line 1 is awkward and it is recommended to replace this term with the term "the."

Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the

> art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 1-31 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The Examiner notes that, for example, lines 8-10 of page 10 of applicants specification states that the differing sensitivity of the imaginary component of AC susceptibility to σ_V and σ_{HK} at high and low DC fields allows computer H_D to derive separate values by curve fitting. While the imaginary component of AC susceptibility may have a differing sensitivity to σ_V and σ_{HK} at high and low DC fields, it is not clear how this allows a computer to derive separate values by curve fitting. Also note lines 15-20 of page 15 of applicant's specification. Again, it is not clear how σ_V and σ_{HK} are derived.

Furthermore it is not clear how V and H_K are solved (see lines 12-14 of page 13 of applicant's specification). Also, and it is not clear how the parameters V and H_K leads to σ_V and σ_{HK} being solved (see lines 12-14 of page 13 of applicant's specification). The relation between σ_V and σ_{HK} and V and H_K is unclear.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. Claims 1, 2, 4, 6, 10-13, 15-17, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over C. Papusoi, Jr. (herein referred to as "CP") (The complex transverse susceptibility) in view of Thin Films magnetic Research (herein referred to as "TFMR") (Magneto-Optical Kerr Effect).

As to Claim 1,

CP discloses applying a DC magnetic field to the sample in a first direction perpendicular to an easy axis of magnetization of the sample ((Figure 1) and (Page 397, Lines 6-7)), applying an AC magnetic field to the sample in a second direction parallel to the easy axis of magnetization of the sample ((Figure 1) and (Page 392, Lines 1-3) and (See Note Below)), separating real and imaginary components of the measurement signal (See Formula's (16) and (17) on page 398), and deriving the anisotropy field distribution and volume distribution values based upon the real and imaginary components and magnitudes of the AC and DC fields ((Figures 3-9) and (Page 391, Lines 5-6 of the Abstract) and (Page 399, Lines 11-15 and equations (19) and (20) and (Page 397, Lines 9-12) and (Page 401, Lines 11-23)).

CP does not disclose measuring a magneto-optic Kerr effect exhibited by the sample to produce a time-varying measurement signal.

TFMR discloses measuring a magneto-optic Kerr effect exhibited by the sample to produce a time-varying measurement signal (See Figure and note Modulator).

It would have been obvious to a person of ordinary skill in the art to modify CP to include measuring a magneto-optic Kerr effect exhibited by the sample to produce a time-varying measurement signal as taught by TFMR in order to measure both absolute Kerr rotation angle and ellipticity (Page 2, Lines 2-3).

It is noted to applicant with regard to the CP reference that the AC field acts in the XY plane and as such the Examiner is interpreting that the applied AC field is parallel to the easy axis of magnetization of the sample. See Figure 1 of CP.

As to Claim 13,

CP discloses means for applying a DC magnetic field over a range of field strengths to the sample in a direction perpendicular to an easy axis of magnetization of the sample ((Figure 1) and (Page 397, Lines 6-7)), means for applying an AC magnetic field to the sample in a direction parallel to the easy axis of magnetization of the sample ((Figure 1) and (Page 392, Lines 1-3) and (See Note Below)), means for separating real and imaginary components of the measurement signal (See Formula's (16) and (17) on page 398), means for deriving separate anisotropy field distribution and volume distribution values based upon differing sensitivity of the imaginary component of the measurement signal to anisotropy field and volume distributions at different DC field strengths ((Figures 3-9) and (Page 391, Lines 5-6 of the Abstract) and (Page 399, Lines 11-15 and equations (19) and (20) and (Page 397, Lines 9-12) and (Page 401, Lines 11-23)).

CP does not disclose means for measuring a magneto-optic Kerr effect exhibited by the sample to produce a time-varying measurement signal.

TFMR discloses means for measuring a magneto-optic Kerr effect exhibited by the sample to produce a time-varying measurement signal (See Figure and note Modulator).

It would have been obvious to a person of ordinary skill in the art to modify CP to include means for measuring a magneto-optic Kerr effect exhibited by the sample to produce a time-varying measurement signal as taught by TFMR in order to measure both absolute Kerr rotation angle and ellipticity (Page 2, Lines 2-3).

It is noted to applicant with regard to the CP reference that the AC field acts in the XY plane and as such the Examiner is interpreting that the applied AC field is parallel to the easy axis of magnetization of the sample. See Figure 1 of CP.

As to Claim 2,

CP discloses the DC field is swept over a range of field strengths (Figures 3-9).

As to Claims 6 and 16,

CP discloses the real and imaginary components are separated from the measurement signal using a lock-in amplifier (Page 400, 11-13).

As to Claim 4,

CP discloses the AC field is controller using a function generator (Page 400, 11-13).

The Examiner notes that lines 11-13 of page 400 refer to a reference [12] which is entitled "AC-Susceptibility Measurements in Small Fields on Fine Superparamagnetic Nickel Particles" to Soffge and has been provided with this Office Action. Please note Figure 1a of this reference.

As to Claims 10 and 21,

CP discloses the easy axis of magnetization is perpendicular to a plane of the magnetic sample (Page 401, Lines 2-3).

As to Claims 11 and 22,

CP discloses the easy axis of magnetization lies in a plane of the magnetic sample (Page 400, Line 15).

As to Claim 12,

CP discloses deriving an anisotropy field distribution and volume distribution values includes separately determining the anisotropy field distribution value and the volume distribution values based upon an differing sensitivity of an imaginary part of transverse AC susceptibility at different magnitudes of the DC magnetic field ((Figures 3-9) and (Page 399, Lines 11-15 and equations (19) and (20) and (Page 397, Lines 9-12) and (Page 401, Lines 11-23)).

As to Claim 15,

CP discloses the means for applying an AC magnetic field includes an AC coil and a function generator that provides an AC drive signal to the AC coil ((Page 400, 11-13) and (Page 5, Lines 20-27 of Applicant's Specification)).

The Examiner notes that lines 11-13 of page 400 refer to a reference [12] which is entitled "AC-Susceptibility Measurements in Small Fields on Fine Superparamagnetic Nickel Particles" to Soffge and has been provided with this Office Action. Please note Figure 1a of this reference.

As to Claim 17,

CP discloses the lock-in amplifier separates the real and the imaginary components based upon the measurement signal and a signal from the means for applying an AC magnetic field (Page 400, 11-13).

The Examiner notes that lines 11-13 of page 400 refer to a reference [12] which is entitled "AC-Susceptibility Measurements in Small Fields on Fine Superparamagnetic Nickel Particles" to Soffge and has been provided with this Office Action. Please note Figure 1a of this reference.

As to Claim 23,

CP discloses measuring AC transverse susceptibility of the magnetic sample while an AC magnetic field is applied to the magnetic sample in a direction parallel to an easy axis of magnetization of the magnetic sample ((Figure 1) and (Page 392, Lines 1-3) and (See Note Below)), and a DC magnetic field is applied over a range of field strengths to the magnetic sample in a direction perpendicular to the easy axis ((Figure

1) and (Page 397, Lines 6-7)), and deriving separate values of anisotropy field distribution and volume distribution based upon a relationship of an imaginary component of AC transverse susceptibility to different DC field strengths ((Figures 3-9) and (Page 391, Lines 5-6 of the Abstract) and (Page 399, Lines 11-15 and equations (19) and (20) and (Page 397, Lines 9-12) and (Page 401, Lines 11-23)).

CP does not disclose the utilization of the magneto-optic Kerr effect exhibited by the magnetic sample.

TFMR discloses the utilization of the magneto-optic Kerr effect exhibited by the magnetic sample. (See Figure).

It would have been obvious to a person of ordinary skill in the art to modify CP to include the utilization of the magneto-optic Kerr effect exhibited by the magnetic sample as taught by TFMR in order to measure both absolute Kerr rotation angle and ellipticity (Page 2, Lines 2-3).

It is noted to applicant with regard to the CP reference that the AC field acts in the XY plane and as such the Examiner is interpreting that the applied AC field is parallel to the easy axis of magnetization of the sample. See Figure 1 of CP.

10. Claims 3, 5, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over C. Papusoi, Jr. (herein referred to as "CP") (The complex transverse susceptibility) in view of Thin Films magnetic Research (herein referred to as "TFMR") (Magneto-Optical Kerr Effect) and in further view of Jacobs et al. (herein referred to as "Jacobs") (4,134,064).

As to Claims 3 and 14,

CP in view of TFMR does not disclose the DC field is generated using an electromagnet.

Jacobs discloses the DC field is generated using an electromagnet (Column 2, Lines 51-59).

It would have been obvious to a person of ordinary skill in the art to modify CP in view of TFMR to include the DC field is generated using an electromagnet as taught by Jacobs in order to utilize a readily available device to generate the DC field.

As to Claim 5,

CP in view of TFMR does not disclose the AC field is generated using a Helmholtz coil.

Jacobs discloses the AC field is generated using a Helmholtz coil (Column 2, Lines 35-50).

It would have been obvious to a person of ordinary skill in the art to modify CP in view of TFMR to include the AC field is generated using a Helmholtz coil as taught by Jacobs in order to utilize a readily available device generate the AC field.

11. Claims 7 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over C. Papusoi, Jr. (herein referred to as "CP") (The complex transverse susceptibility) in view of Thin Films magnetic Research (herein referred to as "TFMR") (Magneto-Optical Kerr Effect) and in further view of Itoh et al. (herein referred to as "Itoh") (5,212,446).

As to Claims 7 and 18,

CP in view of TFMR do not disclose deriving the anisotropy field distribution and volume distribution values is carried out by a computer.

Itoh discloses the use of a computer (Column 1, Lines 56-66).

It would have been obvious to a person of ordinary skill in the art to modify CP in view of TFMR to include deriving the anisotropy field distribution and volume distribution values is carried out by a computer given the above disclosure an teaching of Itoh in order to utilize a readily available device to derive the anisotropy field distribution and volume distribution values.

12. Claims 8 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over C. Papusoi, Jr. (herein referred to as “CP”) (The complex transverse susceptibility) in view of Thin Films magnetic Research (herein referred to as “TFMR”) (Magneto-Optical Kerr Effect) and in further view of Sugitani (6,566,872).

As to Claims 8 and 19,

CP discloses the magnetic sample is a thin film (Page 400, lines 11-14).

CP in view of TFMR does not disclose the magnetic sample is a granular thin film.

Sugitani discloses a granular thin film (Column 22, Lines 26-33).

It would have been obvious to a person of ordinary skill in the art to modify CP in view of TFMR to include the magnetic sample is a granular thin film given the above disclosure and teaching of Sugitani in order to use a film with a relatively high magnetic permeability and resistivity (Column 22, Lines 26-33).

13. Claims 9 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over C. Papusoi, Jr. (herein referred to as "CP") (The complex transverse susceptibility) in view of Thin Films magnetic Research (herein referred to as "TFMR") (Magneto-Optical Kerr Effect) and in further view of Applicant's Admitted Prior Art (AAPA).

As to Claims 9 and 20,

CP in view of TFMR does not disclose the magnetic sample includes magnetic nanoparticles.

AAPA discloses superparamagnetic nanoparticles (Page 4, Lines 23-27).

It would have been obvious to a person of ordinary skill in the art to modify CP in view of TFMR to include the magnetic sample includes magnetic nanoparticles given the above disclosure and teaching of AAPA in order to measure the energy barrier distributions of the superparamagnetic nanoparticles (Page 4, Lines 23-27).

14. Claims 24-27, 30, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over C. Papusoi, Jr. (herein referred to as "CP") (The complex transverse susceptibility) in view of Thin Films magnetic Research (herein referred to as "TFMR") (Magneto-Optical Kerr Effect) and Jacobs et al. (herein referred to as "Jacobs") (4,134,064) and Itoh et al. (herein referred to as "Itoh") (5,212,446).

As to Claim 24,

CP discloses applying a DC magnetic field over a range of field strengths to the sample in a direction perpendicular to an easy axis of magnetization of the sample ((Figure 1) and (Page 397, Lines 6-7)), an AC coil for applying an AC magnetic field to the sample in a direction parallel to the easy axis of magnetization of the sample ((Figure 1) and (Page 392, Lines 1-3) and and (Page 400, second paragraph) and (Page 401, lines 1-6) and (Page 5, Lines 20-27 of Applicant's Specification) and (See Note Below)), signal processing circuitry for separating real and imaginary components of the measurement signal ((See Formula's (16) and (17) on page 398) and (Page 400, 11-13)), deriving separate anisotropy field distribution and volume distribution values based upon differing sensitivity of the imaginary component of the measurement signal to anisotropy field and volume distributions at different DC field strengths ((Figures 3-9) and (Page 391, Lines 5-6 of the Abstract) and (Page 399, Lines 11-15 and equations (19) and (20) and (Page 397, Lines 9-12) and (Page 401, Lines 11-23)).

CP does not disclose an electromagnetic for applying a DC magnetic field over a range of field strengths to the sample in a direction perpendicular to an easy axis of magnetization of the sample, a magneto-optic probe for measuring a magneto-optic Kerr effect exhibited by the sample to produce a time-varying measurement signal, and a computer for deriving separate anisotropy field distribution and volume distribution values based upon differing sensitivity of the imaginary component of the measurement signal to anisotropy field and volume distributions at different DC field strengths.

Jacobs discloses an electromagnet for applying a DC magnetic field (Column 2, Lines 51-59).

It would have been obvious to a person of ordinary skill in the art to modify CP to include an electromagnetic for applying a DC magnetic field over a range of field strengths to the sample in a direction perpendicular to an easy axis of magnetization of the sample given the above disclosure and teaching of Jacobs in order to utilize a readily available device to generate the DC field.

TFMR discloses a magneto-optic probe for measuring a magneto-optic Kerr effect exhibited by the sample to produce a time-varying measurement signal (See Figure and note Modulator).

It would have been obvious to a person of ordinary skill in the art to modify CP to include a magneto-optic probe for measuring a magneto-optic Kerr effect exhibited by the sample to produce a time-varying measurement signal as taught by TFMR in order to measure both absolute Kerr rotation angle and ellipticity (Page 2, Lines 2-3).

Itoh discloses the use of a computer (Column 1, Lines 56-66).

It would have been obvious to a person of ordinary skill in the art to modify CP to include a computer for deriving separate anisotropy field distribution and volume distribution values based upon differing sensitivity of the imaginary component of the measurement signal to anisotropy field and volume distributions at different DC field strengths given the above disclosure an teaching of Itoh in order to utilize a readily available device to derive separate anisotropy field distribution and volume distribution values.

It is noted to applicant with regard to the CP reference that the AC field acts in the XY plane and as such the Examiner is interpreting that the applied AC field is parallel to the easy axis of magnetization of the sample. See Figure 1 of CP.

As to Claim 25,

CP discloses a function generator that provides an AC drive signal to the AC coil (Page 400, 11-13).

The Examiner notes that lines 11-13 of page 400 refer to a reference [12] which is entitled "AC-Susceptibility Measurements in Small Fields on Fine Superparamagnetic Nickel Particles" to Soffge and has been provided with this Office Action. Please note Figure 1a of this reference.

As to Claim 26,

CP discloses the signal processing circuitry includes a lock-in amplifier (Page 400, 11-13).

As to Claim 27,

CP discloses the lock-in amplifier separates the real and imaginary components based upon the measurement signal and a signal from the function generator (Page 400, 11-13).

The Examiner notes that lines 11-13 of page 400 refer to a reference [12] which is entitled "AC-Susceptibility Measurements in Small Fields on Fine Superparamagnetic Nickel Particles" to Soffge and has been provided with this Office Action. Please note Figure 1a of this reference.

As to Claim 30,

CP discloses the easy axis of magnetization is perpendicular to a plane of the magnetic sample (Page 401, Lines 2-3).

As to Claim 31,

CP discloses the easy axis of magnetization lies in a plane of the magnetic sample (Page 400, Line 15).

15. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over C. Papusoi, Jr. (herein referred to as "CP") (The complex transverse susceptibility) in view of Thin Films magnetic Research (herein referred to as "TFMR") (Magneto-Optical Kerr Effect) and Jacobs et al. (herein referred to as "Jacobs") (4,134,064) and Itoh et al. (herein referred to as "Itoh") (5,212,446) and in further view of Sugitani (6,566,872).

CP discloses the magnetic sample is a thin film (Page 400, lines 11-14).

CP in view of TFMR and Jacobs and Itoh does not disclose the magnetic sample is a granular thin film.

Sugitani discloses a granular thin film (Column 22, Lines 26-33).

It would have been obvious to a person of ordinary skill in the art to modify CP in view of TFMR and Jacobs and Itoh to include the magnetic sample is a granular thin film given the above disclosure and teaching of Sugitani in order to use a film with a relatively high magnetic permeability and resistivity (Column 22, Lines 26-33).

16. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over C. Papusoi, Jr. (herein referred to as "CP") (The complex transverse susceptibility) in view

of Thin Films magnetic Research (herein referred to as “TFMR”) (Magneto-Optical Kerr Effect) and Jacobs et al. (herein referred to as “Jacobs”) (4,134,064) and Itoh et al. (herein referred to as “Itoh”) (5,212,446) and in further view of Applicant's Admitted Prior Art (AAPA).

CP in view of TFMR and Jacobs and Itoh does not disclose the magnetic sample includes magnetic nanoparticles.

AAPA discloses superparamagnetic nanoparticles (Page 4, Lines 23-27).

It would have been obvious to a person of ordinary skill in the art to modify CP in view of TFMR and Jacobs and Itoh to include the magnetic sample includes magnetic nanoparticles given the above disclosure and teaching of AAPA in order to measure the energy barrier distributions of the superparamagnetic nanoparticles (Page 4, Lines 23-27).

Conclusion

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See PTO-892.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Schindler whose telephone number is (571) 272-2112. The examiner can normally be reached on M-F (8:00 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Lefkowitz can be reached on (571) 272-2180. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

David Schindler

David Schindler
Examiner
Art Unit 2862

DS

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